of water off Cavallo Pass; latitude 28° 10′ N., longitude 95° 56′ W., where she remained until towed into Galveston the next morning. Storm reports from other vessels follow:

American S. S. *Alabama:*

On the 20th, moderate to whole gale, rough sea, overcast and rain; vessel hove to. On the 21st moderate gale to fresh breeze, overcast and rain; hove to from 1 a. m. to 9 p. m. Position, 7 a. m., 20th, latitude 23° N., longitude 94° 40′ W.; 7 p. m., 21st, latitude 23° 10′ N., longitude 94° 15′ W.

American S. S. *Waxahachie:*

At 1 p. m., G. M. T., 22d, hurricane central near latitude 29° N., longitude 94° W. Highest force of wind 11, SE. Lowest barometer 29.60 inches.

On the 19th and 20th southerly gales prevailed over a limited area between the 35th and 45th parallels, and the 40th and 50th meridians. Storm logs follow:

British S. S. *Strathearn:*

Gale began on the 19th, wind SSE.; lowest barometer 29.68 inches at noon on the 19th, wind SSE., 8; position, latitude 43° 04′ N., longitude 43° 41′ W. End of gale on the 19th, wind S. Highest force of wind 8, SSE.; shifts SSE.–SSW.–SW.–S.

American S. S. *Editor:*

Gale began on the 19th; lowest barometer 29.79 inches at noon on the 20th, wind S., 8; position, latitude 44° 30′ N., longitude 40° 45′ W. End of gale on the 21st, wind WNW. Highest force of wind 8, S.; shifts S.–SW.–WSW.–WNW.

The observer on board the British S. S. *War Mehtar* states that at noon on the 22d, while at latitude 41° 35′ N., longitude 30° 51′ W., passed through tide rip extending in a north and south direction. Foam on outer edges. Temperature of air 76° F., water 69.5° F.

On the 23d moderate northerly gales were encountered over a small area between the 40th and 45th parallels and the 40th and 50th meridians. Storm log follows:

British S. S. *Aspinet:*

Gale began on the 22d, wind SSE.; lowest barometer 29.73 inches at 4 a. m. on the 23d, wind N., 5; position, latitude 42° 38′ N., longitude 44° 26′ W. End of gale on the 23d, wind NNW. Highest force 8, NNW.; shifts not given.

On the 24th and 25th moderate weather was general over the entire ocean, while on the 26th the conditions were similar, except that one vessel reported a moderate gale, as shown by the following storm log:

American S. S. *Steelmaker:*

Gale began on the 25th, wind SSW.; lowest barometer 29.90 inches at 7 p. m. on the 26th, wind SSW.; position, latitude 39° 51′ N., longitude 49° W. End at 8:50 p. m. on the 26th, wind NW.; highest force 8; shifts SSW.–NW.

During the remainder of the month only light to moderate winds were reported over the entire ocean.

The observer on board the American S. S. *Steelmaker* states that at 5:45 p. m. on the 28th, position, latitude 40° 04′ N., longitude 60° 38′ W., observed marked tide rip extending to NNW. and SSE. horizons in a straight line.

The observer on board the British S. S. *Antillian* reports that on the night of the 14th, latitude 52° 21′ N., longitude 6° W., he saw quite distinctly the flashing light on Bardsey Island, Wales; bearing 60° true, distance 55 miles.

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NORTH PACIFIC OCEAN.

By F. G. TINGLEY.

At Dutch Harbor pressure was below normal by some 0.30 inch during the first decade, above normal by about 0.12 inch during the second decade, and below by 0.36 inch during the last decade. At Honolulu it was below normal by 0.04 inch during the first and second decades and approximately normal in the last. At Midway Island it was below normal for the periods 1–5 and 12–17, by about 0.08 inch in each instance, and above normal on other days, the average plus departure being some 0.06 inch.

As will be seen these pressure departures indicate almost a normal degree of atmospheric fluctuation for June and offer very little in the way of explanation for the heat wave which broke upon several continental areas toward the end of the month.

So far as known no typhoons occurred during the month, although it is possible that the one which struck Manila on July 5 may have been in existence at the end of June.

At the beginning of the month a moderate depression was central near the Bonin Islands. During the 2d and 3d it moved slowly north-northeastward and developed somewhat, causing northerly to easterly gales to the east of the Japanese Islands. It disappeared in the direction of Bering Sea on the 5th.

The American four-masted bark, *Moshula*, Capt. F. O. Parker, Manila for San Francisco, encountered this gale on the 3d in latitude 39° 04′ N., longitude 155° 25′ E. The wind set in from ESE. and backed to NE.; highest force 10; barometer at noon of 3d, 29.37 inches. The *Moshula* lost her fore lower topsail, mizzen upper topsail, and jib in this gale.[1]

This depression was followed by another of moderate character which caused a fresh easterly gale in the Yellow Sea on the 4th. The latter depression does not appear to have developed.

On the 5th there were evidences of a large but rather shallow depression between Dutch Harbor and Midway Island. By the following day it had developed somewhat to the northeastward with barometer readings as low as 29.16 inches in the southern part of the Gulf of Alaska accompanied by a fresh SE. gale. This depression moved very slowly and still covered the same waters on the 12th. On the 13th, however, it moved inland on the British Columbian coast, in advance of the rising pressure in the region of the Aleutians.

The Japanese S. S. *Suwa Maru*, Capt. M. Machida, Yokohama (May 28) for Seattle, had this gale from the 6th to 8th. Second Officer and Observer, S. Mitomi, furnishes the following report:

Gale began on the 6th, wind SW.; lowest barometer, 29.16 inches at 6 a. m., same date, in latitude 51° 55′ N., longitude 145° 30′ W.; end of gale on the 8th, wind SE.; highest force, 9, SE.

Prior to the passing of this depression the North Pacific anticyclone had not attained the normal development for June. Its crest during this month is located in about latitude 37° N., longitude 147° W., with a central isobar of 30.25 inches. Up to the 13th, there was only a weak anticyclone between the Hawaiian Islands and the Lower California Peninsula. With the passing of the depression just referred to, however, this area was reinforced by the rising pressure over the Aleutians, thereby causing the center to shift to the northwestward to about the usual position, where it remained to the end of the month.

During the last half of the month two moderate depressions moved slowly across the northern part of the ocean. The first of these was in evidence to the southward of Japan on the 15th, whence it moved northeastward to the region of the Aleutians by the 21st.

[1] Further particulars regarding the report of this vessel will be found on page 360.

The second depression followed in about the same track. On the 21st it was central to the southward of Japan, and was causing a strong ENE. gale along the coast in the vicinity of Yokohama.

The British S. S. *Robert Dollar*, Capt. M. Ridley, Seattle, for Kobe, experienced this gale on the 21st when off Oshima. Observer M. M. Blackadder has furnished the following report:

Gale began on the 21st, wind ENE.; lowest barometer 29.55 inches at 2 p. m. same date, in latitude 33° 40′ N., longitude 136° 30′ E.; end of gale on 22d, wind NE. by E.; highest force, 9, ENE.

By the 29th the depression had moved to the western part of the Gulf of Alaska and a moderate to fresh gale was blowing on its southern edge. The Japanese S. S. *Mandasan Maru*, Capt. R. Watanabe, Yokohama for San Francisco, had this gale on the 29th and 30th. Following is the report from this vessel:

Gale began on the 28th, wind W. by S.; lowest barometer 29.51 inches at 8 a. m., same date, in latitude 47° 46′ N., longitude 164° 15′ W.; end of gale on 30th, wind W.; highest force, 8 W.; shifts, 2 points.

From the 20th until the end of the month pressure continued low near the Aleutians and a series of weak depressions moved thence over Alaska and the British Northwest Territories.

A waterspout was observed from the British S. S. *Eastern Prince* on June 29. This vessel, under command of Capt. E. Naylor, was proceeding southward along the west coast of Central America at the time. Second Officer and Observer T. R. Jones states that between 8:30 a. m. and 9 a. m. (A. T. S.), when in approximately latitude 8° 38′ N., longitude 88° 58 W., a waterspout formed at a distance of some 8 to 10 miles from the vessel, in a WNW. direction. It traveled in a westerly direction. The sky was overcast at the time and a heavy rain falling; lightning and thunder occurred later; the wind force was between 1 and 2, Beaufort.

Fog was reported on numerous occasions during the month.

WEATHER LOG OF AMERICAN BARK "MOSHULA."

Among the vessel weather reports received recently by the Weather Bureau was one strongly suggestive of the days before steam power had so largely supplanted sail on the oceans. This report was from Capt. F. O. Parker, of the American four-masted bark *Moshula*, United States Shipping Board, and covered a voyage from Newcastle (Australia) via Manila to San Francisco. The *Moshula* sailed from Newcastle, with a cargo of 5,050 tons of coal, on November 12, 1920, and arrived at Manila January 10, 1921, being 57 days at sea and covering a distance of some 7,306 miles. Sailing from Manila on May 3, she arrived at San Francisco on July 4, 63 days. Distance sailed, approximately 7,681 miles.

In addition to the valuable meteorological data contained in the report, numerous entries under the head of "Remarks" lend an intimate touch not usually found in reports of the present day. The following notes are taken at random from this part of Capt. Parker's report:

December 8: 7 a. m., heavy cloudburst, filled all tanks. This was in latitude 1° 51′ S., longitude 163° 10′ E.

December 16: 5° 02′ N., 160° 51′ E. Heavy squalls (ESE.); main royal blown away.

December 24: 17° 11′ N., 143° 08′ E. Heavy swell from SW. Hard squalls; lower top gallant, flying jib and mizzen upper topsail blown away.

January 7: Noon, Corregedor bearing E.-N., 15 miles. Making four-hour tacks; beat 20 miles dead to windward in 24 hours; has 5,000 tons of coal on board and has been one year out of dock.

May 3: Manila Bay, 6 p. m. Set sail, hove up anchor and proceeded down the Bay. Midnight, Corregedor Light abeam; North Channel, fine clear weather.

June 2: 37° 03′ N., 155° 44′ E. Heavy gale from E. to NE.; blew away fore lower topsail, mizzen upper topsail and jib; wind shifted from ESE. to NE. in gale.

July 5: Off Farallones; tug *Sea Wolf* took us in tow and anchored off Meig's Wharf at 5:30 p. m.

The *Moshula* "crossed the line" on December 9, in longitude 163° 26′ E. During the eight days preceding the average run was 50 miles and for the eight days following, 65 miles. The daily average for the entire voyage was about 125 miles. The best day's run was on June 23–24, when on an E. course in a moderate SW. gale the *Moshula* logged 251 miles.

WEATHER OF THE NORTH INDIAN OCEAN.

Capt. Charles Olson of the American S. S. *Easterling* has submitted the following note regarding the weather experienced in the Indian Ocean during the period May 17 to June 1, 1921:

We passed Ujung Tapa Gaga Light 8:40 p. m. on the 17th. Sea and breeze moderate. The breeze freshened with a rough sea on the 20th and we experienced an ENE. set of ½ knot for the preceding day; squalls and heavy clouds all the way. Moderate seas and westerly winds on the south and west of Ceylon.

Arrived at Colombo on the afternoon of the 22d and sailed in the evening of the 23d.

From Colombo to Minikoi the sea and winds were moderate. We experienced a very heavy rainstorm 30 miles SE. of Minikoi.

The course was then set for Ras Hafin (on the 25th), winds westerly, sea moderate, and the weather fine with occasional squalls to latitude 9° 50′ N., longitude 60° 00′ E., where the SW. wind with a force of 4 to 6 had caused a rough sea. At noon of the 29th in this position changed the course to go north of Sokotra. The set for the preceding day was NW., 0.8 knot. The SW. monsoon was blowing strong then and continued so with overcast sky and high seas until we passed 40 miles north of Sokotra on the night of May 31 and June 1.

After passing Sokotra the SW. monsoon came in again, blowing with moderate force and a moderate sea which gradually decreased as we neared the Red Sea.

GALE OFF CAPE OF GOOD HOPE.

The American S. S. *Hampton Roads*, Capt. S. W. Pine, Durban for Key West, experienced heavy weather June 15–17, when rounding Cape of Good Hope. Second Officer and Observer E. Walker has submitted the following report:

Gale began on the 15th, the wind backing through N. to NW. reaching force 8 in squalls. Position of ship at noon (G. M. T.), latitude 34° 42′ S., longitude 24° 21′ E. At noon on the 16th the wind shifted to W. force 10, and at 4 p. m. increased to force 11. This was the height of the gale and the lowest barometer, 29.60 inches, occurred at this time. There were heavy passing squalls with rain and hail and lightning all around the horizon. Sea rough and choppy. On the 17th the wind shifted to NW., decreasing to force 9, with a rising barometer. At 8 a. m. of the 18th the wind was NW., 5, with a moderate sea; barometer 30.11 inches; position, 34° 30′ S., 16° 20′ E.